BIOSTRATIGRAPHIC STUDY OF THE GURPI FORMATION BASED ON PLANKTONIC FORAMINIFERA IN Lar area (Kuh - e -kurdeh section)

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Abstract

The study of planktonic foraminifera of the Gurpi formations at Lar area (Kuhe-kurdeh section) enables me to find the most standard biozones defined in mediterranean regions, especially Tethysian domain. Five biozones were determined. Biozones I (*Globotruncanita elevata* zone) and II (*Globotruncana ventricosa* zone) and III (*Radotruncana calcarata* zone) indicate the Early Campanian and Middle and Late Campanian, respectively. Biozones IV (*Globotruncanita stuarti* zone) and V (*Gansserina gansseri* zone) suggest the Early and Middle Maastrichtian, respectively. In the Late Maastrichtian, due to decreasing in water depth at the study area, *Abathomphalus mayaroensis* zone defined in Tethysian domain was not recognised.

Keywords: Gurpi Formation; Upper Cretaceous; Planktonic Foraminifera; Biozonation

Introduction

At the type section (E: 49° 13' 47", N: 32° 26' 50"), the Gurpi Formation composed of 320 meters grey to blue marl and shale beds and occasionally thin beds of argillaceous limestone (Darvishzadeh,1992, James & Wynd,1965, Motiei, 1993, Setudehnia,1972). The Gurpi Formation overlies the Ilam Formation and is disconformably overlain by the Pabdeh Formation at the type section (Motiei, 1993). The main purpose of this research was to identify a biostratigraphic zonation of Gurpi Formation in Lar area (Kuh-e-kurdeh section) and correlation with Gurpi type section in Lali area and other Micro fauna of Gurpi Formation were studied by universally accepted biozones. Kalantary (1992) and Jalali (1971).

Study Area and Methodology

The study area is located in 12.5 Km of NE of Lar, South of Iran (E: 54° 36' 35", N: 27° 44' 08") (Fig.1). Fieldwork was concentrated at the Kuh-e-kurdeh.

The thickness of Gurpi Formation is 70 meters in studied section and consists of: Marl, Limy marl, Marly shale and Marly limestone. It unconformably overlies the Ilam Formation and is overlain by the Tarbur Formation.

Samples were taken almost every 2 meters. Approximately 90 samples were collected. Samples were studied by two ways: Hard samples were studied by making thin sections and soft samples were studied by washing method. Dried residues were then size sorted through sieves at half –phi intervals from 500 µm

down to 63 μ m. Foraminifera were picked and studied from the residues in the 250-355 μ m size fractions.

After particular process had been carried out, Foraminifera were studied in thin section and Scanning Electronic Microscope (S.E.M).

Foraminifer's taxonomy and nomenclature follows Bolli and et. (1987), Leoblich and Tappan (1964, 1987), Sliter (1989) ,Longoria (1991), Robaszynski and Caron,1979,1995 ,Premoli Silva and Sliter 1995, Loeblich and Tappan 1998, Ellis and Messina 1999, Premolisilva and Verga,2004).



Figure1. Locality map of study area

Results and Discussion

Biostratigraphy

Planktonic foraminifera are important to universal biostratigraphy zonation of Upper Cretaceous marine sediments. The value of these foraminifera for correlation has been discussed by Bandy (1967).

10 genera and 22 species of planktonic foraminifera were recognized at the studied area, also 5 biozones were identified in thin section and isolated specimens (Fig.2).

1- Globotruncanita elevata biozone:

Author: Dalbiez (1955)

Definition: Partial range zone from the first appearance of *Globotruncanita elevate* to the first appearance of *Globotruncana ventricosa*.

Characteristics: The first occurrence of the genus *Globotruncana arca*, *Globotruncana bulloides*, *Globotruncana lapparenti* and *Rosita fornicata* has been taken in this biozone.

Age: Early Campanian.

This biozone was recorded from Tethys (Caron, 1978, Sliter, 1989) and Sarvestan area (Vaziri Moghaddam, 2002) from the Early Campanian.

2- Globotruncana ventricosa biozone:

Author: Dalbiez (1955)

Definition: Interval zone from the first appearance of *Globotruncana ventricosa* to the first appearance of *Globotruncanita calcarata*.

Characteristics: *Globotruncana arca*, *Globotruncana bulloides*, *Globotruncana lapparenti*, *Rosita fornicata* and *Globotruncana linneiana* are observed in this biozone.

Remarks: The last occurrence of Rosita patelliformis is in this biozone.

Age: Middle Campanian.

This biozone was recorded from Tethys (Caron, 1978, Sliter, 1989) and Sarvestan area (Vaziri Moghaddam, 2002) from the Middle Campanian.

3- Radotruncana calcarata biozone:

Author: Herm (1962)

Definition: Total range zone of Globotruncanita calcarata.

Characteristic: The dominant taxa in this biozone are: *Globotruncana arca*, *Globotruncana bulloides*, *Globotruncana lapparenti*, *Globotruncana linneiana* and *Contusotruncana fornicata*.

Remarks: The first occurrence of Globotruncanita stuarti is in this biozone.

Age: Late Campanian.

This biozone was recorded from Central Tethys (Barr, 1972), Tethys (Caron, 1978, Sliter, 1989) and Sarvestan area (Vaziri Moghaddam, 2002) from the Late Campanian.

4- Globotruncanita stuarti biozone:

Definition: Partial range zone from the last appearance of *Globotruncanita calcarata* and the first appearance of *Gansserina gansseri*.

Characteristics: *Globotruncana arca, Globotruncana bulloides, Globotruncana lapparenti* and *Globotruncanita stuartiformis* are occurred in this biozone.

Remarks: The first occurrence of Globotruncanita stuartiformis and Globotruncana falsostuarti is in this biozone.

Age: Early Maastrichtian.

This biozone was recorded from Central Tethys (Barr, 1972), Zagros (Wynd, 1965) and Sarvestan area (Vaziri Moghaddam, 2002) from the Lower Maastrichtian.

5- Gansserina gansseri biozone:

Author: Bronnimann (1952)

Definition: Interval zone from the first appearance of *Gansserina gansseri* to Gurpi-Tarbur Formations boundary (*Abathomphalus mayaroensis* biozone was not found in this section).

Characteristics: The dominant taxa in this biozone are: *Globotruncana linneiana*, *Globotruncana falsostuarti*, *Globotruncanita stuarti* and *Globotruncanita stuartiformis*.

Remarks: The first occurrence of *Contusotruncana contusa* is recorded in this biozone. Age: Middle-Upper Maastrichtian.

This biozone was recorded from Central Tethys (Barr, 1972), Tethys (Caron, 1978, Sliter, 1989) and Sarvestan area (Vaziri Moghaddam, 2002) from the Middle-Upper Maastrichtian.

Table 1 also shows the correlation of the proposed biostratigraphic zonation in this study with some zonal schemes from other localities .The proposed scheme most closely resemble to Vaziri Moghaddam(2002) for Sarvestan area (SE of Shiraz, Iran).

Globotruncanella havanensis and *Globotruncana aegyptica* are rared in this area; therefore these species can not form any biozones too. In the Late Maastrichtian, water depth decreased and limestones of the Tarbur Formation overlies the Gurpi Formation, therefore the *Abathomphalus mayaroensis* biozone was not recognized at this section.



Figure2. Distribution and planktonic foraminiferal zonation of the Gurpi Formation at Lar area

S t a g e 65	Barr(1972)	Caron(1978)	Sliter(1989)	James and Wynd (1965)	Vaziri Moghadam (2002)	Mandanizadeh (2005)
	Central Tethys	Tethys	Tethys	Zagros	Sarvestan Area	Lar Area
astrichtian 6	Abathomphalus mayaroensis	Abathomphalus mayaroensis	Abathomphalus mayaroensis	Abathomphalus mayaroensis		
	Gansserina gansseri	Gansserina gansseri	Gansserina gansseri	Globotruncanita stuarti + Pseudotextularia varians	Gansserina gansseri	Gansserina gansseri
	Globotruncanita stuarti + Globotruncana falsostuarti	Globotruncana aegyptica	Globotruncana aegyptica		Globotruncanita stuarti	Globotruncanita stuarti
a M		Globotruncanella havanensis	Globotruncanella havanensis			
	Globotruncanita calcarata	Globotruncanita calcarata	Globotruncanita calcarata		Globotruncanita calcarata	Globotruncanita calcarata
m p a n i a	Globotruncanita elevata + Globotrancanita stuartiformis	Globotruncana ventricosa	Globotruncana ventricosa	Globotruncanita elevata	Globotruncana ventricosa	Globotruncana ventricosa
е С		Globotruncanita elevata	Globotruncanita elevata		Globotruncanita elevata	Globotruncanita elevata

Table1. Correlation of the proposed biostratigraphic zonal scheme at Lar area with other accepted standard biozones of other parts of the world

Conclusion

a) 10 genera and 22 species of planktonic foraminifera were identified from Gurpi Formation in Lar area (Kuh-e-kurdeh section).

b) 5 biozones were identified, respectively: *Globotruncanita elevata* (Early Campanian), *Globotruncana ventricosa* (Middle Campanian), *Radotruncana calcarata* (Late Campanian), *Globotruncanita stuarti* (Early Maastrichtian) and *Gansserina gansseri* (Middle-Upper Maastrichtian).

c) The proposed zonal scheme is most closely resemble to Vaziri Moghaddam (2002), Sliter

d) Due to decreasing of water depth in the upper Maastrichtian, *Abathomphalus mayaroensis* biozone was not recognized at the studied area.

e) Observing of *Abathomphalus intermedius* shows that age of Gurpi Formation in Lar area is Early Campanian-Late Maastrichtian.

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